

UNIVERSITY, INDUSTRY AND RESEARCH COOPERATION: THE LAZIO PULSE INITIATIVE

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Abstract

The aim of the paper is to introduce the Lazio Pulse initiative as an example of a successful partnership and cooperation among University, Research Centres and Industry. The Lazio Pulse initiative aims to develop a dynamic ecosystem of public and private actors for improving Research and Innovation, based on the value and knowledge generated by cross-disciplinary Open Scientific Data. This ecosystem constitutes a scientific pole of excellence, which through open innovation, contributes to the national and international competitiveness of the Lazio Region by supporting growth of new businesses.

Lazio Pulse operates as a central node of a public and private network that, by exploiting Open Scientific Data, increases the collaboration among business and society, develops new opportunities for the territory, thus enhancing the existing skills and infrastructures. Lazio Pulse aims to foster also the development of new skills and business opportunities by educating “data scientists” and generating new value for young talents in the new emerging ICT sectors (Big Data, IoT, Cloud Computing, HLPC), thus increasing the economic growth of the “Third Sector” through new IT solutions and applications. By engaging the society in co-designing IT products and services, Lazio Pulse develops new ideas, guaranteeing a bigger impact on our society and private economy (mobility, smart cities, security, intelligent buildings, home automation).

Lazio Pulse is capitalizing on existing organisational, logistics and economic resources to build a sharing network among the local actors as part of the “eScience”, “eBusiness” and “eSociety” task forces, and at the same time enabling this network to be active in regional, national and international actions, for ensuring that the initiative will be sustainable over time.

The unique characteristic of the Lazio Pulse, compared to similar initiatives, is the direct connection between the scientific production, market and society, the great offer and the plurality of the actors involved.

Within the Lazio Pulse framework, the WIRE16 event has been organised (Workshop Research, Business and Innovation). This event, for the second consecutive year, combined the work and research of creative, entrepreneurs, students and researchers to present in 5 minutes their ideas, a practical example of the cross-sectorial cooperation among different worlds.

This paper provides a description of the activities developed within the Lazio Pulse initiative and the results achieved through the WIRE16 event, based on the analysis of ex-ante and ex-post qualitative questionnaires.

Keywords: research, innovation, industry, cooperation, ICT, scientific data, education

1 THE LAZIO PULSE INITIATIVE

Rapid advances in digital technologies (e.g. Cloud computing, Semantic Web) combined with an increasing capability to monitor our planet through a web of sensors (e.g. eScience data like Earth Observation from space, crowd-sourcing and data mining, in-situ networks, Smart and Wireless Sensors, Internet of Things, etc.) have led to a true *Data Revolution*, whereby Petabytes of data are now routinely generated to *support growth*. The Rapid transition of Research towards Science 2.0 shows the on-going systematic changes in doing Research and organizing Science driven by rapid advances in ICT and Digital Technologies, combined with a growing demand to do Science **for** Society (actionable research) and **in** Society (co-design of knowledge) [1].

Data is a key building block shaping the knowledge of nature and the base of our information, today fuelling economic growth and creating a better society. Data from Science are collected and analysed by universities, research infrastructures and bring with them a unique know-how. Data provide the foundation of eScience to advance the understanding of how our planet operates as an integrated system. The digital revolution is now changing the way of doing and organising research, by fostering a new world of data-intensive research, referred as *Open Science* [2], characterized by openness, access to large volume of complex data, availability of community tools, unprecedented level of computing power and global collaboration among researchers and new actors, such as citizen scientists. However, data are not always understandable, as well as known, *among* and *outside* the scientific community. In everyday life we are typically familiar with macro data, lands usage, maps, GDP, pollution indicators, etc., all values constituting the output of a large number of data subsets from science in different research field, accessible and understandable only by experts. The question is how to unlock the full potential of data for the benefit of science and businesses? The open data revolution provides the fuel for the development of innovative services, offering incredible opportunities to young entrepreneurs to turn data into highly innovative commercial ventures and to companies to diversify their services/products and reposition their business chains.

Lazio is one of the European Region with the highest presence of Research Infrastructure and University, is a leader among the Italian regions [3] in R&D, where the 65% of R&D came from the public sector, over 4/5 of the total R&D employees and the 40% of public Italian investments. Huge opportunities for small firms are not well exploited, due to the small investment of privates companies in innovation. The idea is to create an ecosystem to enable the ICT market to make accessible data from science, the infrastructure and the knowhow, sharing it with the big companies that can train the SMEs to create new market opportunities.

In this context, in order to foster the next generation of data-driven digital start-ups in Europe, it is proposed to develop a regional Public Private Partnership of stakeholders interested in sharing data, know-how and infrastructures.

This ecosystem is supported by the already existing infrastructures of the Research Centres mainly based in Frascati area, which are willing to share a huge amount of data through open software and gain by the existing ESA BICs infrastructures (Business Incubation Centres).

Also, important to note that this initiative goes well beyond a simple project by providing a framework or venture to propel innovation ecosystems transversal to several different sectors:

- Space
- Life sciences
- Cultural and Creative industries
- Agrifood
- Security
- Environment
- Smart, green and integrated transport
- e-Health and Wellbeing

Although there exist several initiatives on innovation in Europe and globally (e.g. Technology and Knowledge and Innovation Communities KICs [4] (in Europe, iHub in Africa), our approach remains unique due to its scope, specific focused on eScience Data, and its integrated infrastructure and service offer, capitalizing on existing Regional Research Centres and industries' assets.

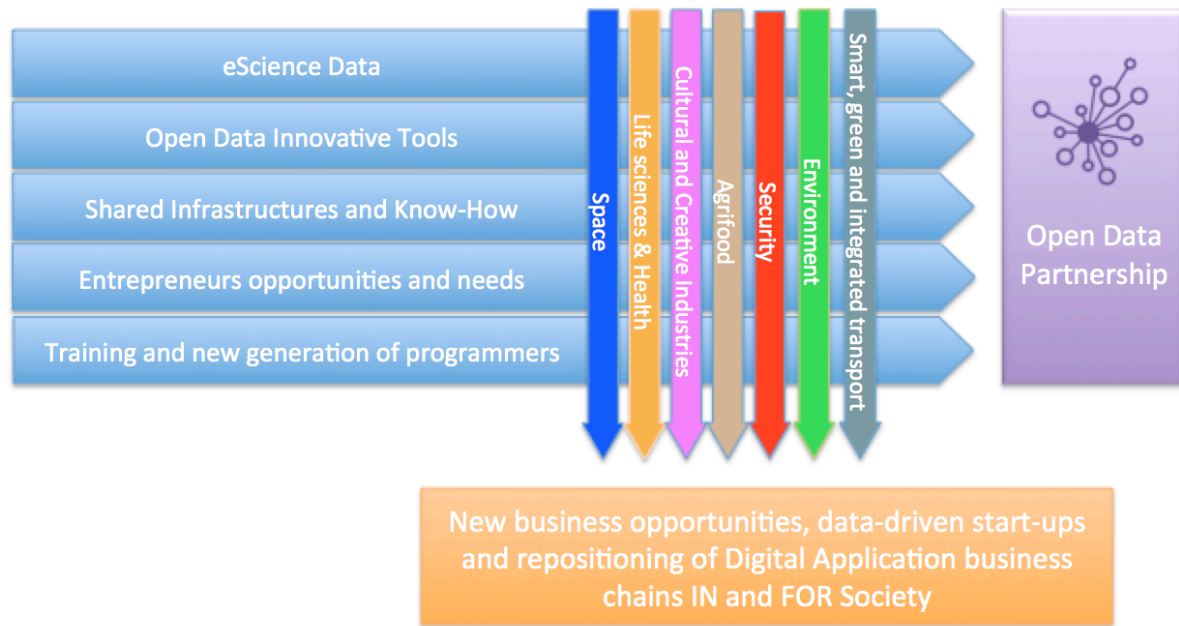


Figure 1 The Lazio Pulse Initiative

More in detail, the **context** of the initiative:

- the Information and Communication Technology (ICT) sector, enabler for the main regional production chains, can offer huge opportunities to solve the growing societal challenges, create a **new economy based on innovation** and support **young talents** to create start-ups and business opportunities;
- the growing **digitization** needs of the business world and **reindustrialization** of processes, by developing smart factories and **repositioning** companies to maintain their leadership in the technological and productive areas of specialization [5];
- the huge value related to the knowledge and market of **multidisciplinary** and **interdisciplinary** products promoting fertile environments and systems able to integrate resources and skills for generating new ideas;
- the involvement of society in a **research and innovation participatory process** (co-design of knowledge and citizen science) to place the Rome area as a leader in communicating and disseminating science and technology throughout Europe [6].

Lazio Pulse strengths:

- a **public-private** partnership at local level with critical mass of laboratories, universities, research centers and organizations, as well as SMEs and large innovative companies in ICT residing in the Lazio Region and participating in the project;
- the high interest shown by the scientific community, the business world, municipalities and institutions of the Lazio Region in promoting a joint action to enhance the existing **knowledge, capabilities and infrastructures** through the sharing of **Science data** [7];
- the interest of the scientists to disseminate the information collected, by facilitating the publication of research results through **open data** accessible to **all levels of society** [8];
- the creation of new **research and innovation transfer models** for improving the cooperation among business, research and finance worlds, and accomplish the match between demand, supply and the need to accelerate the **access to the market** [9].

2 UNIVERSITY, INDUSTRY AND RESEARCH COLLABORATION IN THE TUSCULUM RESEARCH AREA

Originally the COPIT (Parliamentary Committee for the technological innovation) has attempted to create the Tusculum Research Area, however, its initial push to the institutions slowly vanished. In 2006 citizens and researchers have launched collaboration and drafted the Frascati Scienza manifesto [10]. At the same time, in 2006 the National Institute for Nuclear Physics (INFN), in partnership with ENEA and OAR-INAF, has won the call from the European Commission and organised the first edition of the European Researchers' Night. In 2008, taking into account the success of the "Night" and the need to create a super partes entity, Frascati Scienza has arisen, constituted in the form of cultural association – with "the participation of the Frascati municipality" – at the benefit of citizens and researchers. The objectives of Frascati Scienza are [11]:

- spreading the scientific culture, experiencing the thrill of discovery
- empowering the Research Area of Rome and its infrastructures located in the Tusculum area
- training the researchers to science communication activities and spreading of results.

At the beginning, the Association has organised its activities and events for researchers, the general public and young people, reinforcing the role of the territory and the public/scientific institutions as representatives of Science Communication. Other projects have arisen in partnership with the local associations and among the different institutions – Synergy [12] – and with the society – WIRE15 [13], [14]. These activities aimed to spread the objectives of Frascati Scienza and to realise the Tusculum Research and Innovation Area.

In 2015, at the request of ESA-ESRIN, Frascati Scienza have promoted the Lazio Pulse joint action on the territory by engaging the scientific actors involved in exploiting data from eScience.

The creation of the Tusculum Research and Innovation Area requires the collaboration among *Research Centers, institutions and industrial partners*. Interests are various as the methodologies employed: to invest on youngsters and their business culture, to protect and add value to the current resources through FABLABs, incubators, business accelerators, spin-offs and start-ups. Certainly we need to create a "framework" able to involve all the interested actors, starting from the existing assets with a sight to the future, transforming the breeding ground built by several small excellences in an ecosystem able to produce benefits for the research world, the society and the economy. An ecosystem to exchange information, develop projects and activate interdisciplinary and multidisciplinary synergies, where the research is the starting point to engage companies and create new jobs/opportunities for young people.

ICT is a common interest for the stakeholders and a tool through which everyone on the territory can act equally. All the Research Centers have data, know-how and infrastructures to share. ICT is currently one of the main public and private investment area, relevant for companies working in this field or benefiting from its services, but most importantly it is necessary to solve the future challenges of the society (health, wellness, environment, etc) and this is the relevant point of connection between Lazio Pulse and the actors engaged in the Tusculum area.

All the **research and public entities** involved in the initiative: ASI, Consiglio Nazionale delle Ricerche – Area di Ricerca di Roma Tor Vergata, Ente per le Nuove tecnologie, l'Energia e l'Ambiente – Area di Ricerca di Frascati e Casaccia, European Space Agency – ESA-ESRIN, Istituto Nazionale di Geofisica e Vulcanologia – Roma, Istituto Nazionale di Astrofisica – Sedi dell'OAR, dell'IFSI e dello IASF, Istituto Nazionale di Fisica Nucleare – Laboratori Nazionali di Frascati, Sezione di Roma, Sezione di Roma Tor Vergata, Sezione di Roma Tre, Università degli Studi di Roma "Tor Vergata", Istituto Superiore di Sanità – ISS, Sapienza Università di Roma– Impresapiens, Università Telematica Uninettuno, Università Campus Bio-medico di Roma, Soprintendenza Speciale per il Colosseo, il Museo Nazionale Romano e l'Area Archeologica di Roma – and **the large companies and SMEs**: Engineering Ingegneria Informatica spa, Telecom Italia spa, ELIS, SAS spa, IDS, DSTECH, Unidata spa, Olsa Informatica spa, Expert System spa, Info Solution spa, Digital Video spa, Evoluzione ufficio sas, Fondazione Italia Camp, Consorzio Regioni Digitali CRED, Science4Biz srls, Eurokleis srl, Euro-Engineering, T6-Ecosystems srl, Aedos srl, Nousmed srl, Evodevo srl, Innovation Engineering srl, SenTech srl, System Management srl, Deepblue srl, LINK srl, CiaoTech srl – and **the local entities**: Comunità Montana, Parco dei Castelli Romani, Comune di Frascati, Comune di Cave, Comune di Colonna, Comune di Monteporzio Catone, Comune di Rocca di Papa, Comune di Genazzano – and the **associations**: Associazione Frascati Scienza and Associazione PIUU.

3 WIRE16 RESULTS

This event, for the second consecutive year, brings back together researchers, creative, entrepreneurs, students and investors to present in 5 minutes their ideas. More than 60 people submitted their ideas and 24 speakers have been selected to present their projects. A scientific committee composed by researchers, investors and entrepreneurs has evaluated the ideas by taking into account these criteria: technical and scientific content, innovation, clarity of the presentation, curriculum/idea ratio. Three amongst the projects submitted have won a prize thanks to the support of ESA-ESRIN (European Space Agency): best idea, innovation and best communicator prizes.

WIRE16 has acted as a tool to think over the current state of the territory and to promote the importance of the collaboration between research and business worlds in order to open new opportunities for the Tusculum area. After the presentation session, during WIRE16, it has been organised a space for discussion in order to identify the meaning of the word "territory" and what might be the ingredients and the goals to achieve through the Lazio Pulse innovation ecosystem. These are the questions asked to the public: how can we turn an area of scientific excellence characterised by poor industrial production in an ecosystem? How can we create "open innovation" for this ecosystem?

From the discussion it has emerged that:

- the collaboration among research and industry is needed and especially start-ups and companies should work together with researchers to invent new products and transfer the already existing technologies
- the research centers should address the planning of services and products for the next future of the Tusculum area. Research centers should talk with the actors of the territory to create new settlements
- researchers should engage industries and entrepreneurs to visit the research centers and laboratories in order to be aware of their equipment and the potentialities to use together these infrastructures for developing new products and services. The result of this work should be the creation of spin-offs, start-ups and new companies not only at national level but especially at local level
- to promote the value of research centers it is necessary to work more on communication activities at local level. This would increase the social and economic impact of scientific productions and should motivate industrial actors to invest more on research
- the relevance of research centers in the Tusculum area is not evident. The people participating to the discussion suggested to develop a platform to enable researchers and entrepreneurs to communicate among each others and with the society, to draw on new ideas, proposals and even solutions for the companies
- we need to help researchers to understand which is the socio-economic value of their scientific activities. We need to guide researchers to best take advantage of their knowledge and develop business models for their technologies, in order to be ready to reach the market on time
- research world and industrial world should communicate and benefit from a mutual evaluation and contamination of their work
- on the Tusculum area there are no business incubators to intercept the demand of those who invest in R&D. There is a systemic problem in Italy, indeed, business incubators are funded by public institutions. In other countries both public and private investors fund these ecosystems. Private investments for business incubators benefiting from higher amount of money should be incentivised also in Italy
- investors should be willing to take risks and finance also ideas with no immediate realization. Both researchers and investors should take this risk. Researchers should be more interested in the transfer of their technologies and products.

During WIRE16 and through the Frascati Scienza website, we have collected 45 ex-ante and 45 ex-post questionnaires. Our team has analysed the questionnaires and we provide here the results of the evaluation. Most of the people who participated in the survey and interested in the WIRE16 event are male (64%) and adults from 35 to 54 years old (56%). The respondents to the WIRE16 ex-ante questionnaire are mainly researchers and entrepreneurs.

The majority of the respondents to the ex-ante questionnaire are interested in submitting an idea to WIRE16 (56%). Word of mouth has been the communication tool most used for promoting WIRE16, but also emails through the newsletter of Frascati Scienza.

From the analysis of the ex-ante questionnaires it has emerged that the Tusculum area could constitute a center for the generation of new ideas and entrepreneurial activities, in particular related to the IT area, nanotechnologies and renewable energies. The respondents expressed the importance of creating a space for researchers and innovators to share their ideas and put them in touch with the business world. WIRE16 constitutes the right tool to create new collaborations for developing innovative projects and a network for researchers, entrepreneurs and investors.

Most of the people who participated in the WIRE16 event and replied to the ex-post questionnaire are male (60%) and adults from 20 to 34 years old (42%). The majority of the respondents to the ex-post questionnaire did not submit an idea to WIRE16 (51%). The people who participated to WIRE16 are mainly researchers and entrepreneurs (respectively 24%). The majority of the respondents is satisfied by the event (92%). People who participated to WIRE16 and in the ex-post survey supports the event is mainly useful to stimulate the collaboration among researchers and entrepreneurs (30%) and to support people in understanding researchers' work (26%).

CONCLUSIONS

In this paper we have presented the Lazio Pulse initiative, which has been submitted to the Lazio Region in order to be funded at regional level. Currently, the Lazio Pulse team is working on multiple ideas to submit both at local and international level in order to boost as much as possible the potential of this initiative.

Within this process, we identified three main actions that should be accomplished in the short term:

- political engagement (top down): this term refers to the various actions aimed to consolidate the interests of the Lazio Pulse stakeholders. Within this context, the local institutions, among which Comunità Montana, Parco dei Castelli Romani and all the local mayors, play a key role in promoting the Lazio Pulse project among the research actors and the regional institutions. We are currently organising a meeting with the stakeholders and key actors to spread the objectives of the project and reinforce the partnership, also by signing the "Lazio Pulse Manifesto"
- actions and impact assessment: the project is focused on the exploitation and rationalisation of the existing resources. However, we have not yet analysed its development in detail, neither its potential benefits have been quantified for the Lazio Pulse stakeholders. It is required to draft a Master Plan (a strategic document to draw up general hypotheses of planning activities to put in place for the local community, to identify the interested parties, potential funding sources, tools and actions needed to realise it)
- dissemination of the project (bottom up): we are currently involving all the actors interested in collaborating with and through Lazio Pulse to promote the objectives of the initiative and the potential benefits it can produce for the society as a whole and not only the research and business worlds.

The Lazio Pulse team is also activating several partnerships at European level among universities, research centers and SMEs to create new opportunities and draft new projects in different domains.

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